A Correlational Study of Self-learning Computer-assisted Instruction, Self-directed Learning Readiness and Learning Effectiveness of the Forth-year Nursing Students in a Five-year Junior College

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The International Council of Nurses 23rd Quadrennial Congress 2005 in Taiwan (Poster Session)

2005.5.21-27

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ABSTRACTS

Background: Self-directed learning has been emphasized in today's nursing education in order for students to take up with challenges. Evidence has found that readiness is one of the critical factors affecting students' learning effectives (LE).

Objective: The objective of this study was to examine the relationship among self-learning computer-assisted instruction (SLCAI), self-directed learning readiness (SDLR) and learning effectiveness (LE).

Methods: A correlational study design was undertaken with a convenience sample of 981 forth-year nursing students attending physical assessment course. SLCAI was developed by five experienced course instructors who used it as a teaching tool for each class. Students utilized it as a learning tool after each class. Students were asked to record their usage of SLCAI. Usage of SLCAI refers to the length of time spending on SLCAI. SDLR was measured by SDLR scale containing 55 items on a 5-point Likert scale (1: never; 5: always) and LE by mid-term and final written tests and validation examination.

Results: Based on 851 respondents, results showed (1) mean of SDLR scale was 176.62±24.2, score $\leqq$174 classified as low SDLR and $>$174 as high SDLR, (2) high SDLR students tended to spend more time on SLCAI ($t=-2.25$, $p<0.05$) , (3) high SDLR students tended to have higher LE ($F=2.88$, $p<0.05$) and (4) using SLCAI students tended to have higher LE ($F=12.51$, $p<0.001$).

Conclusions: Self-directed learning readiness can be applied by instructors in the diagnosis of student learning needs, in order for them to implement teaching strategies that will best suit students and enhance their learning effectiveness.

INTRODUCTION

Physical assessment (PA) is a necessary acquisition for nurses because it could help nurses detect normal and abnormal signs and/or symptoms and evaluate the effectiveness of nursing interventions during clinical practice. However, learning PA is different from other nursing skills because of its complexity, breadth, and involvement of clinical decisions. Nursing education is effective to bridge the gap between knowledge acquisition, skill development, and real-world application. Therefore, the teaching strategy is important to strengthen students' learning effectiveness.

Student's learning ability is the motivation of self-development in the 21st century that is full of informative challenges. Therefore, designing an informative learning environment emphasizing on interactive teaching and learning appears extremely important. Instructors may encourage students to develop their self-learning behavior actively constructing knowledge through integration of classroom teaching and students' exploration and comprehension (Lin, 2002).

Nursing education is effective to bridge the gap between knowledge acquisition, skill development, and real-world application. Therefore, the teaching strategy is important to strengthen students' learning effectiveness.

This study was to design SLCAI, which is consisted of PA course material integrating PA knowledge and skills. The **objective** of this study was to investigate students' self-directed learning readiness (SDLR), usage of SLCAI, and their learning effectives (LE) in a PA course. Instructors may implement SLCAI as an in-class teaching tool. Students may use it as an after-class self leaning tool based on their learning needs and speed. The ultimate purpose of this study is to improve PA teaching quality based on students' SDLR and the impact of SLCAI on LE. Figure 1. is the conceptual framework of this study.

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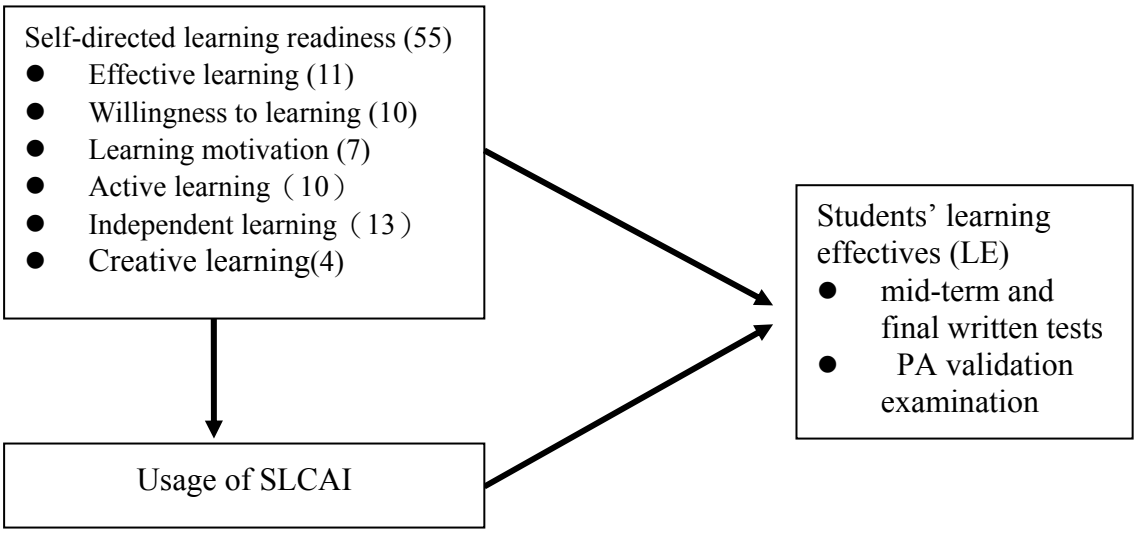


Figure 1. Conceptual Framework of this study

METHOD AND PROCEDURES

Establishments of SLCAI: Five instructors with several years of teaching PA experiences involved in designing SLCAI. The content of SLCAI was based on the textbook titled Physical Assessment: The Application in Nursing Care (Chiou, 2004). SLCAI was divided into four systems including cardiovascular, respiratory, abdomen, and nervous systems. In each system, anatomy, physiology, basic and distinctive PA skills with synchronizing audio effects were introduced. For example, real normal heart sounds and murmur were presented in cardiovascular system and breathing sounds in respiratory system. In addition, PA skill lively demonstration by instructors was included in each system. The diversity of SLCAI representation may increase students' learning motivation and provide students with different learning resources. Figure 2 is an example of the content of SLCAI.

Figure 2 An example of the content of SLCAI

Measurement of Self-directed Learning Readiness

Self-directed learning was measured by self-directed learning readiness scale SDLRS), which was developed by Guglielmino (1977). SDLRS is to measure adult learners' self-directed learning tendency. In this study, SDLRS was translated by TengYun-Lin (1992).

SDLRS was a five-point Likert type scale: 5 means "I always feel this way", 4 "Most of time I feel this way", 3 "I frequently feel this way", 2 "I sometimes feel

this way", and 1 "I never feel this way". Higher total score refers to higher self-directed learning tendency and vice versa. Further, the total scores above the median are called high self-directed learning tendency and vice versa.

SDLR was measured by SDLR scale containing 55 items on a 5-point Likert scale (1: never; 5: always)

SDLR Chinese version consisted of 55 items was revised by Den (1992). The reliability shows Cronbach's α 0.64-0.85，A component factor analysis found six factors of SDLR Chinese version: effective learning, willingness to learn, learning motivation, active learning, independent learning, and creative learning. A total of 89.74% of the variance could be explained. In this study, 5 students participated in pre-test of the SDLR Chinese version emphasizing on the appropriateness and difficulties of the content and wording of the scale. These students completed the scale within 10-15 minutes and expressed that the scale was easy to understand. A Cronbach's α 0.89 was found in this study.

Evaluation of LE: This study was undertaken from September 2003 through January 2004 with a convenience sample of 981 fourth-year nursing students in a five-year junior college in southern Taiwan. At the beginning of the study, SLCAI was offered to students attending PA course. Students were required to record the usage of SLCAI and filled out SDLR Chinese version. LE was determined by mid-term and final written tests as well as PA validation examination. Figure 3 shows students' usage of SLCAI after class.

圖三、同學課後自我學習情形之二個畫面

RESULTS and DISCUSSION

A. Usage of SLCAI

A total of 981 self-learning computer-assisted learning manuals were distributed and 851 were replied (86.7%). Among 851 respondents, 93.2% used the SLCAI. The

total minutes spending on SLCAI ranges from 10 to 2200 with an average of 287 minutes (SD=314.6). Based on the total time spending on SLCAI, five categories were made: 0 minute, ≤25%, 25~50%, 50~75%, and ≥75%.

B. Self-directed Learning Readiness Scale (SDLR Scale)

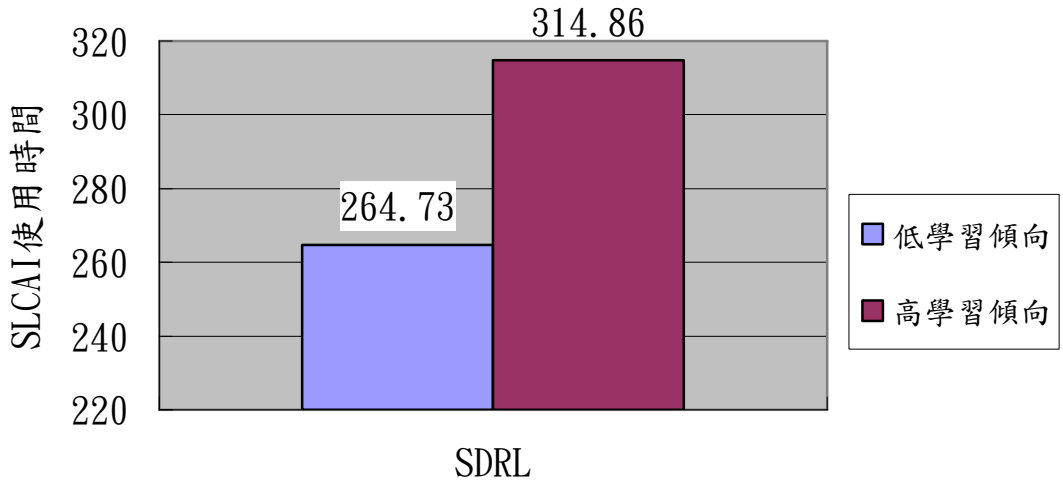
The mean of 929 SDLR scale was 176.62±24.2. The total score above the median are called high self-directed learning tendency and vice versa. In this study, the median was 174 points. Thus, score≦174 was classified as low SDLR and ＞174 as high SDLR.

C. Results of Learning Effectiveness (LE)

The LE was obtained from the mid-term and final written tests as well as validation examination. Among 977 students attending PA course, the mean score of mid-term and final written tests and validation examination is 71.95(SD=14.13), 82.81(SD=13.69), 70.07(SD=14.27).

D. The impact of SDLR on the usage of SLCAI

Figure 4 indicates that students with higher SDLR tend to spend more time on the SLCAI (t= -2.25, p＜.05).



圖四、自我學習傾向對光碟使用情形之影響

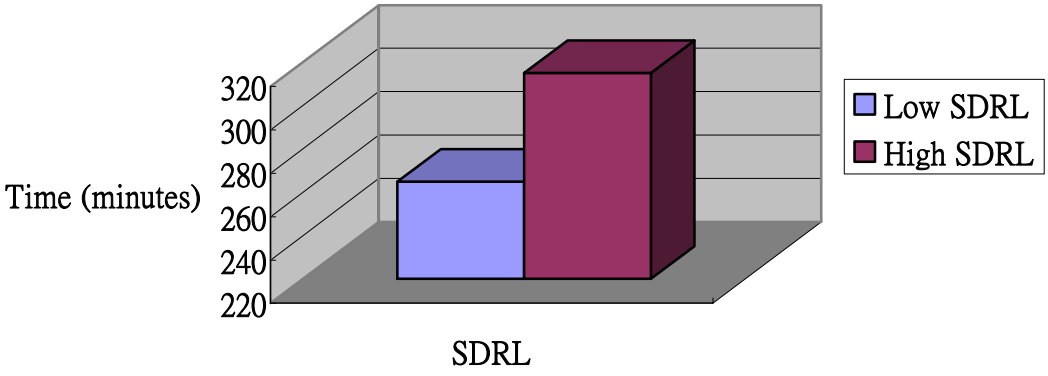


Figure 4. SDRL Effect on The Time of Spending on SLCAI

E. The Impact of SDLR and the usage of SLCAI on LE

A two-way ANOVA was applied to analyze the impact of SDLR and the usage of SLCAI on LE. The Turkey Multiple Comparison was then chosen to find out the difference when a two-way ANOVA showed a significant difference.

Table 1 and Figure 5 show the result of two-way ANOVA. No interaction between SDLR and SLCAI was found (p=.24), but SDLR and SLCAI have the main effect on LE.

Table 2 shows high SDLR students tended to have higher LE (F=12.51, p<0.001) and using SLCAI students tended to have higher LE (F=2.88, p<0.05)

Table 1. Two-way ANOVA

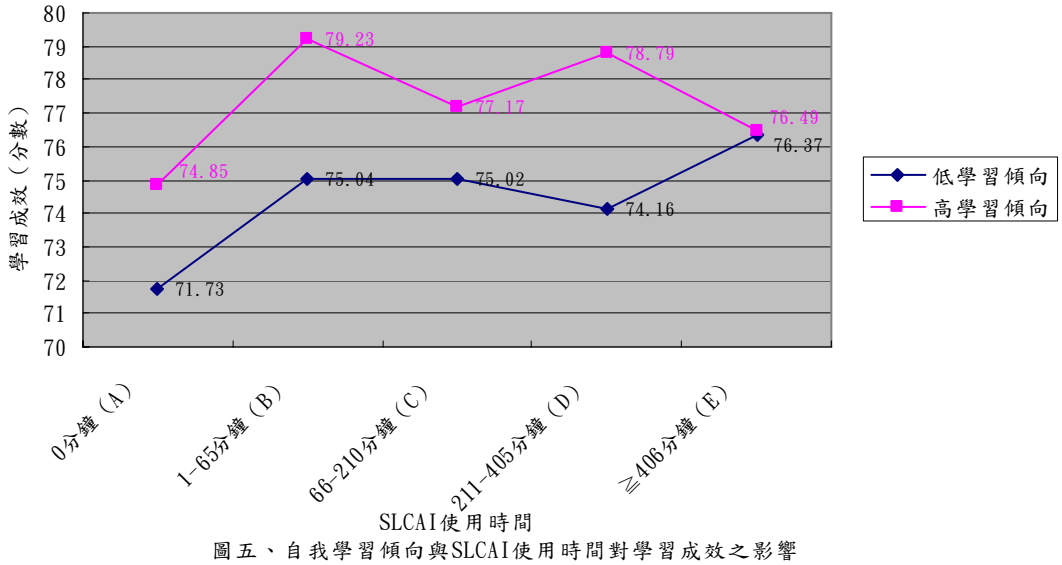
	Source	SS	df	MS	F	P value
Between	Usage of SLCAI	1168.69	4	292.17	2.88*	0.02
	SDLR	1271.14	1	1271.14	12.51*	0.00
	Usage of SLCAI*SDLR	563.35	4	140.84	1.39	0.24
Residual (within group)		81392.45	801	101.61		
Total		84508.29	810			

* p＜.05

Table 2. The impact of SDLR and the usage of SLCAI on LE

	n	M	SD	p 值	多重比較
SDLR					
Low SDLR (1)	414	74.52	10.42	0.00	(1)＜(2)

High SDLR (2)	397	77.15	9.84		
The Usage of SLCAI					
0 minutes (A)	141	73.19	11.04	0.02	A＜BCDE
1-65 minutes (B)	58	76.77	8.80		
66-210 minutes (C)	216	75.99	9.45		
211-405 minutes (D)	198	76.57	10.19		
≧406 minutes (E)	198	76.43	10.91		



圖五、自我學習傾向與SLCAI使用時間對學習成效之影響

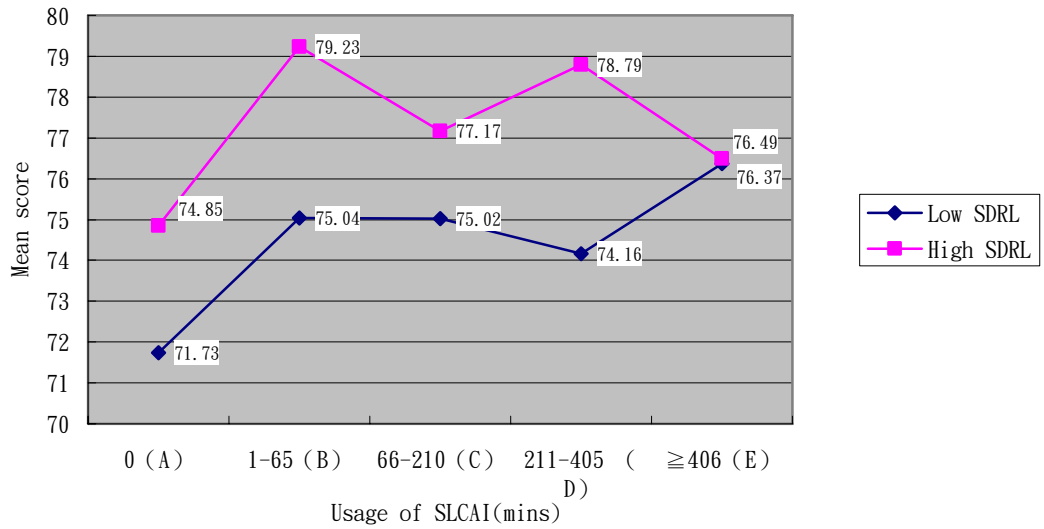


Figure 5. The Impact of SDLR and the Usage of SLCAI on LE

CONCLUSION AND FUTURE STUDY

The result of this study shows higher SDLR students tend to have higher LE comparing with lower SDLR. Further, students using SLCAI tend to have higher LE comparing with students not using SLCAI.

This study suggests designing a series of teaching strategies for students with lower LE. Also, the implementation of SLCAI appears to strengthen tradition teaching method.

SLCAI used in this study only includes the content of PA course material (the content of PA textbook) and exercises of situation problems. However, more clinical diagnostic exercises and nursing interventions need to be included in the future. Thus, students may extend the learning experience from SLCAI to their clinical practices.

SLCAI creates a self-learning environment for students. They may use SLCAI after classes to achieve higher LE. Besides, instructors may share teaching resources during the process of designing SLCAI.

A multidisciplinary corporation is necessary and recommended for designing a multi-media teaching instruction.

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